KOPIO
RSVP Review Status Sheet

Date: January 13, 2005

WBS No.	1.4.3	**Title: KOPIO**	
Preparer/Manager:	C Pearson	**Current Cost Estimate (FY05 $M)**	$11.63
		Assigned Contingency	27%

Cost Elements (FY05 $M)

Materials	$ 3.77
Effort	$ 3.62
Overhead	$ 1.98
Contingency	$ 2.26
Total	**$ 11.63**

WBS Dictionary Definition:

Provides the 'B'-line beam transport from the AGS Switchyard to the KOPIO proton target, the KOPIO neutral beam, and the general infrastructure needs for the KOPIO experimental area.

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Date: January 13, 2005

WBS No.	1.4.3.1	**Title: Project Support and Integration**	
Preparer/Manager:	C Pearson	**Current Cost Estimate (FY05 $M)**	$1.99
		Assigned Contingency	16.4 %

Cost Elements (FY05 $M)

Materials	-
Effort	$ 1.22
Overhead	$ 0.57
Contingency	$ 0.2
Total	**$ 1.99**

WBS Dictionary Definition:
Provides for overall project support by a liaison engineer and liaison physicist.
Provides general engineering and technical supervision support for instrumentation, controls, and security systems
Provides general design and documentation support.
Provides C-AD construction supervision.

Technical Level of Confidence:

Prototype Demonstrated		Elements built & tested	
Similar system exists	X	Similar Technology works	
Novel system concept		No candidate concept yet	
Other (see comments)			

Comment(s):

Basis of the Cost Estimate: (by percentage of total cost)

Commercial product		Engineered design	
Engineered conceptual		Scientist conceptual	
Guess		Other (see comments)	100%
		Total	100%

Comment(s): Previous project support experience

Status of Hardware/Software Development: Not applicable

Issues (funding, collaborator shortage, engineering help, etc.): None

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Date: January 13, 2005

WBS No.	1.4.3.2	**Title: Primary Beam**	
Preparer/Manager:	C Pearson	**Current Cost Estimate (FY05 $M)**	$2.78
		Assigned Contingency	18.5%

Cost Elements (FY05 $M)

Materials	$ 0.66
Effort	$ 1.2
Overhead	$ 0.57
Contingency	$ 0.35

Total	**$ 2.78**

WBS Dictionary Definition:
Provides for labor and materials required to construct the proton transport beam for the KOPIO experiment. This effort starts at the exit of the AGS switchyard and ends at the KOPIO proton target.
The existing equipment in the 'B' lines and 'C' lines will be removed and shielding reconfigured. Nine existing magnets and power supplies will be prepared and installed. New beam instrumentation and a new vacuum system will be fabricated and installed.

Technical Level of Confidence:

Prototype Demonstrated		Elements built & tested	
Similar system exists	X	Similar Technology works	
Novel system concept		No candidate concept yet	
Other (see comments)			

Comment(s):

Basis of the Cost Estimate: (by percentage of total cost)

Commercial product	20%	Engineered design	35%
Engineered conceptual	20%	Scientist conceptual	15%
Guess	10%	Other (see comments)	
		Total	100%

Comment(s):

Status of Hardware/Software Development:
Magnets and power supplies are available from C-A inventory
Most radiation shielding is available from C-A inventory

Issues (funding, collaborator shortage, engineering help, etc.):

- Beam transport design is preliminary. Actual design may require additional beam elements
- Beam instrumentation requirements need scrubbing
- Proton target position is influenced by experimental requirements such as production angle, neutral beam size, experimental area size, and experimental shielding requirements.
- Proton beam dump position and design needs further study to minimize experimental background

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Date: January 13, 2005

WBS No.	1.4.3.3	**Title: Common Equipment/Facilities**	
Preparer/Manager:	C Pearson	**Current Cost Estimate (FY05 $M)**	$0.671
		Assigned Contingency	22%

Cost Elements (FY05 $M)

Materials	$ 0.273
Effort	$ 0.169
Overhead	$ 0.132
Contingency	$ 0.097
Total	**$ 0.671**

WBS Dictionary Definition:

Provides labor and materials required to provide equipment common to more than one WBS area and general facilities related upgrades.
The existing Cooling Tower #2 system will be upgraded to provide cooling water for the Neutral beam and experimental area pump skids.
A PLC- based magnet interlock system will be fabricated for the primary beam, neutral beam, and experimental sweeper.
Bldg 912 roof vents will be replaced and sealed.
The EEBA crane will be modified for operation with a radio control system.
All controls interface hardware for the KOPIO beamline magnet power supplies and beam instrumentation will be provided.
An enclosure will be constructed to provide protection/climate control for the controls and instrumentation electronics.

Technical Level of Confidence:

Prototype Demonstrated		Elements built & tested	
Similar system exists	X	Similar Technology works	
Novel system concept		No candidate concept yet	
Other (see comments)			

Comment(s):

Basis of the Cost Estimate: (by percentage of total cost)

Commercial product	50%	Engineered design	30%
Engineered conceptual	10%	Scientist conceptual	
Guess	10%	Other (see comments)	
		Total	100%

Comment(s):

Status of Hardware/Software Development:

Cooling Tower #2 systems and distribution piping exists.
Many PLC-based magnet interlock system are utilized by C-A.

Issues (funding, collaborator shortage, engineering help, etc.):

None

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Date: January 13, 2005

WBS No.	1.4.3.4	**Title: B-Line Security System Mods.**	
Preparer/Manager:	C Pearson	**Current Cost Estimate (FY05 $M)**	$0.486
		Assigned Contingency	19.8%

Cost Elements (FY05 $M)

Materials	$ 0.092
Effort	$ 0.221
Overhead	$ 0.111
Contingency	$ .062
Total	**$ 0.486**

WBS Dictionary Definition:
Personnel access system for the beam cave and experimental area. The system is PLC-based and modeled after the existing NSRL system.

Technical Level of Confidence:

Prototype Demonstrated		Elements built & tested	
Similar system exists	X	Similar Technology works	
Novel system concept		No candidate concept yet	
Other (see comments)			

Comment(s):

Basis of the Cost Estimate: (by percentage of total cost)

Commercial product	30%	Engineered design	30%
Engineered conceptual	40%	Scientist conceptual	
Guess	5%	Other (see comments)	
		Total	100%

Comment(s):

Status of Hardware/Software Development:
Most of the hardware is commercially available. The software has not been developed but will be similar to the NSRL beam line software.

Issues (funding, collaborator shortage, engineering help, etc.):
None

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Date: January 13, 2005

WBS No. 1.4.3.5 **Title: Neutral Beam**
Preparer/Manager: C Pearson **Current Cost Estimate (FY05 $M)** $3.82
Assigned Contingency 37%

Cost Elements (FY05 $M)

Materials	$ 1.78
Effort	$ 0.58
Overhead	$ 0.59
Contingency	$ 0.87
Total	**$ 3.82**

WBS Dictionary Definition:
Provides the labor and materials required to fabricate and install the KOPIO neutral beam.
The neutral beam includes the proton beam target, 3 sweeping magnets, a collimator system, vacuum chamber, and shielding.
Two pump skids will be fabricated to provide closed loop cooling water to the proton target, sweeping magnets, and experimental equipment.

Technical Level of Confidence:

Prototype Demonstrated		Elements built & tested	
Similar system exists		Similar Technology works	
Novel system concept		No candidate concept yet	
Other (see comments)	X		

Comment(s): By component parts similar systems exists. Integrated design is Conceptual and challenging

Basis of the Cost Estimate: (by percentage of total cost)

Commercial product		Engineered design	
Engineered conceptual	25%	Scientist conceptual	50%
Guess	25%	Other (see comments)	
		Total	100%

Comment(s):

Status of Hardware/Software Development:
The proposed proton target is based on a Triumph design. Preliminary thermal calculations have been completed.
Preliminary engineering designs have been completed for the 3 sweeping magnets.
D1 magnet is a radiation-hard design developed at C-A for the SNS Project.

Issues (funding, collaborator shortage, engineering help, etc.):

- Baselining the parameters for the proton beam and neutral beam requirements is required to proceed to a final design effort
- Shielding requirements need further study
- Collimator geometry and alignment tolerances need further study
- Sweeping magnet designs need to be optimized for cost and compatibility with existing C-A power supplies
- After KOPIO baselining, a six month preliminary design effort by C-A is required. This effort will integrate the technical design issues for the production target, neutral beam, and experimental area. The design effort will provide the basis for detailed engineering and design.

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The neutral beam includes the proton beam target, 3 sweeping magnets, a collimator system, vacuum chamber, and shielding.
Two pump skids will be fabricated to provide closed loop cooling water to the proton target, sweeping magnets, and experimental equipment.

Technical Level of Confidence:

Prototype Demonstrated		Elements built & tested	
Similar system exists		Similar Technology works	
Novel system concept		No candidate concept yet	
Other (see comments)	X		

Comment(s): By component parts similar systems exists. Integrated design is Conceptual and challenging

Basis of the Cost Estimate: (by percentage of total cost)

Commercial product		Engineered design	
Engineered conceptual	25%	Scientist conceptual	50%
Guess	25%	Other (see comments)	
		Total	100%

Comment(s):

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The proposed proton target is based on a Triumph design. Preliminary thermal calculations have been completed.
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